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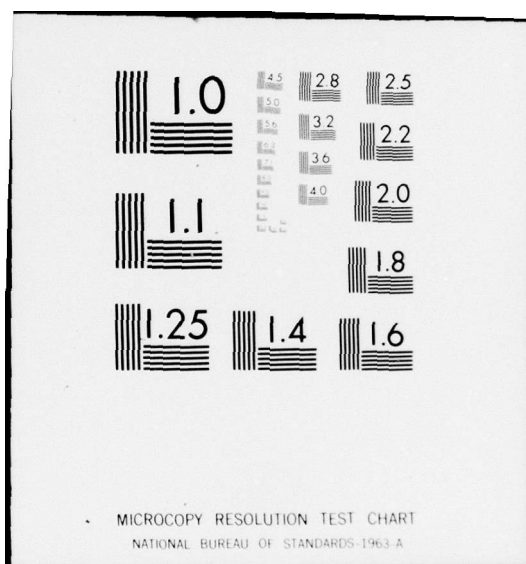   MAR 52   S R ASPINALL   F/G 5/2

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⑩ S. R./Aspinall

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EUROPEAN SCIENTIFIC NOTES

1 March 1952   Vol. 6, No. 5

AMERICAN EMBASSY   LONDON, ENGLAND

AERODYNAMICS RESEARCH AT THE SWISS FEDERAL INSTITUTE OF TECHNOLOGY

Current work at the Institut für Aerodynamik of
the Eidgenössische Technische Hochschule, Zürich, under
the direction of Professor J. Ackeret is concerned with a
number of interesting and fundamental problems in aero-
dynamics, in the selection of which the following view-
points have played a role: On the one hand, part of these
investigations are chosen to be interesting and instructive
laboratory exercises for the students in their regular
course work. On the other hand, it is preferred to avoid
studies which are likely to be carried on by the large
government laboratories abroad in order to avoid past occur-
rences where the work at Zürich had been unexpectedly
anticipated.

Subsonic Diffusers

One of these projects, under Dr. H. Sprenger,
concerns a systematic study of the influence of curvature
on the recovery factor in subsonic diffusers. The basic
pattern is that of a conical diffuser with an 8° angular
opening and an entrance to exit area ratio of 1:4. In one
series the sections normal to the axis are circles; in the
other the cross sections are ellipses of continuously vary-
ing eccentricity starting with a circular entrance and end-
ing with an exit aperture in the shape of an ellipse whose
major and minor axes have a ratio of about 5:1. Five wood
models of such diffusers have been built, being pieced
together out of meridian sections; three of these are of
the circular type, the diffuser axes being respectively
straight, a circular arc turning through 15°, and a circular
arc turning through 30°. The two models of the circular-
elliptical type have a straight axis and a 15° turn.

respectively. Student measurements of the stagnation pressure distributions in the exit area have furnished the following recovery figures:

	circular	circular-elliptic
0° turn	96%	8? %
15° turn	90%	6? %
30° turn	78%	

The lower value of the recovery factor in the straight elliptical diffuser is ascribed to decreasing exploitation by the flow of the regions near the high-curvature vertices of the elliptical cross sections. Its higher value when a turn is incorporated is ascribed to secondary flow which leads to an effective use of these regions. The problem under investigation by Dr. Sprenger is that of predicting the character of this secondary flow and the development of appropriate designs for curved diffusers which take this into account. More carefully machined models will then be built to these specifications in order to check the results.

Boundary Layer Effects

The exploratory basic experiments consist in sliding a rectangular wing of constant chord and constant angle of incidence into a wind tunnel of rectangular cross section through one of the side walls in such a fashion that a narrow space is left between the opposite wall and the wing tip. Measurements of the pressure are made along the wing surfaces for distances between wing tip and wall which vary from a fraction to twice the width of the boundary layer along the latter. In this fashion the variation of gross aerodynamic characteristics of the wing, especially the progressive reduction of induced drag, as well as the detailed modifications of the flow, are to be studied as the wing tip enters the boundary layer of the wall.

At present Dr. R. Hürlimann, who is in charge of this investigation, has set up the experiment in a small low-speed tunnel. A wing of uncambered slender profile with a series of pressure holes on its top surface along the line of maximum thickness is used at zero angle of attack. The pressure measurements are carried out for various flow speeds as laboratory exercises by students. With these simple results to check his analysis in the incompressible case, Dr. Hürlimann is now setting up similar experiments at high subsonic speeds. A particular context in which these studies are expected to find applications is that of predicting cascade efficiencies, especially in the case where the foils of one cascade have to plow through the trailing wakes from the foils of a previous one.

Flow patterns like that describing the secondary
flow which is induced by the above experiment in the plane
of a cross section of the channel are being studied by
Dr. B. Chaix in an electrolytic tank, again set up as a
student's exercise to acquaint them with the use of such a
facility.

A Theoretical Problem

One of the various methods proposed for the sake
of prolonging the region of laminar flow and of avoiding
flow separation along boundary sections where the pressure
gradient is positive, consists in giving to the bounding
surface a velocity in the flow direction (e.g., by letting
it consist of a flexible material moving on rollers). The
deviations from potential flow due to viscous forces in
the boundary layer are thus reduced, flow separation delayed,
and the profile drag correspondingly decreased. In order
to evaluate theoretically the advantages to be gained by
such a scheme, the resistance coefficients have been deter-
mined for circular and elliptical cylinders under the assump-
tion that their surfaces move in the flow direction at the
free stream velocity when immersed in a uniform viscous flow
normal to the direction of their axes. For circular cylinders
the laminar flow drag coefficient is thereby halved. Rough
preliminary estimates have shown a significant reduction in
the profile drag of airfoils if the surface strip between
the line of maximal thickness and the trailing edge is made
to move at as small a fraction as one fifth of the free
stream velocity.

These investigations have raised the following
abstract but basic problem: Let a number of solid bodies
be immersed in an incompressible viscous flow and assume
that every boundary element keeps moving at the velocity
corresponding to an inviscid potential flow for the same
configuration. This inviscid flow is then a solution of
the Navier-Stokes equation since the velocity components
are harmonic functions. The problem is now that of the
stability of this flow; in other words, is it possible under
these circumstances that regions of turbulent flow are
developed?

PLASTIC FLOW THEORIES OF SINTERING

Mr. P. Murray of the Atomic Energy Research
Establishment, Harwell, has completed an extensive research
on the validity of the plastic flow theories for the mechanism
of sintering. In a paper presented 28 January at a meeting
on sintering at Bristol University, Murray described the
results of his work on ionic and metal powders. Data have
been analyzed by the Clark-White and Shuttleworth-Mackenzie
plastic flow theories.

Briefly, these treatments can be summarized as follows: in the Clark-White mechanism, shrinkage is produced by capillary forces. Particles in contact form lens-like regions between them and by analysis of the forces and flow of the material in these regions, equations have been derived for the rate of shrinkage. In the Shuttleworth-Mackenzie treatment, a compressed powder is considered to be a solid containing isolated spherical pores of equal size. Sintering occurs by deformation caused by surface tension, and the effect of the latter is the same as an externally applied pressure. Equations for the change in density with time have been derived. Both treatments utilize the Bingham type flow in which the material has a yield point.

It was found that both of these treatments can be fitted to the data, but this was not accepted as proof of the validity of either. Neither of these treatments was completely successful, but it was thought this is probably a matter of detail rather than fundamental error. Consequently, to seek the source of this discrepancy, an additional check on the plastic flow hypothesis was made by comparing yield stress and viscosity values obtained from independent experiments with values derived from analysis of the sintering data by the Shuttleworth-Mackenzie equation. Stress-strain and deformation-time experiments were conducted on the powders from which yield stress and viscosity values were obtained which were found to agree fairly well with those derived from the sintering data.

It was discovered in these supplementary experiments, however, that strain hardening occurs and the higher the strain rate, the greater the work hardening. Thus the Bingham-type solid is oversimplified and the Clark-White and Shuttleworth-Mackenzie treatments which utilize this type of flow are not wholly acceptable in their present form.

VISCOSITY OF LIQUID METALS

According to Andrade's theory, the temperature dependence of the viscosity of liquid metals is given by a straight line in a plot of log viscosity versus the reciprocal of the absolute temperature down to the freezing point. In some recent research, Dr. V. Kondic and T.P. Yao, of the Department of Metallurgy, Birmingham University have found that this behavior is obeyed by pure metals. It has been detected, however, that some alloys show a tremendous deviation from a straight line toward increased viscosity at temperatures just above the freezing point. For example,

the viscosity of molten pure aluminum conforms to Andrade's theory, but the addition of 0.1°/o titanium to aluminum produces a large increase in viscosity which begins at a temperature of about 5°C above the liquidus.

Presumably this effect is due to a marked increase in order of the structure of the liquid alloy as the temperature decreases toward the liquidus. It is thought that the presence of titanium increases the number of atom clusters or potential nuclei in the liquid. This interpretation is supported by the finer grain size obtained with the Al-Ti alloy upon subsequent solidification.

NODULAR CAST IRON

The magnesium process for producing nodular cast iron has the advantage of being useful over a wide range of carbon contents, but suffers from the fact that it will work (i.e., produce graphite nodules) with only certain irons. Residual elements such as lead, bismuth, antimony, and titanium have an adverse effect in that they can suppress the formation of nodules in magnesium-treated iron. Mr. H. Morrogh of the British Cast Iron Research Association has made a study of the influence of these so-called interference elements and has developed means of inhibiting their detrimental effect by the addition of cerium. This work is part of the subject of a paper to be presented at the 1952 Meeting of the American Foundrymen's Society.

Morrogh has found that as little as 0.009°/o Pb is detrimental to Mg-treated nodular iron. It appears that this is a cooling rate effect in that the specific amount of Pb which is harmful depends upon the size of the casting and the rate at which it is cooled. The addition of 0.02°/o Ce, however, will neutralize the effect in both ferritic and pearlite iron.

The harmful effect of 0.006°/o Bi is overcome by the addition of 0.02°/o Ce so that nodular graphite is obtained The detrimental effect of Sb, which appears to be independent of cooling rate, is counteracted by addition of Ce.

Morrogh has also discovered that the addition of Ce to Mg-treated iron containing 0.15°/o Ti will produce a nodular structure, whereas without Ce this material does not form nodules of graphite. Further, in Mg-treated nodular iron containing Ti, the addition of Cu increases the harmful effect of Ti. In Ce-treated nodular iron, however, this effect does not occur.

In most of the cases cited, the quantity of Ce needed is much less than that which would appear to be necessary for chemical combination. The actual mechanism, therefore, is uncertain at the present time.

YIELD POINT PHENOMENA

The plasticity group under the direction of Professor A.H. Cottrell of the Department of Metallurgy, University of Birmingham, has recently made several significant advances. As part of a general investigation of yield point phenomena in metals and alloys, research has been conducted on zinc, alpha and beta brass, and iron.

Blue Brittleness in Zinc

M.J. Dumbleton has investigated the occurrence of blue brittleness in zinc. This phenomenon has often been observed in tensile tests at temperatures of 150-300°C on iron containing nitrogen in interstitial solid solution. The effect is characterized by repeated yielding producing a jagged stress-strain curve. It has been discovered that blue brittleness occurs at temperatures of about 100°C in commercially pure zinc known to contain nitrogen, but is not found in super-purity zinc. Experiments with super-purity zinc into which nitrogen has been introduced are now in progress.

The theory which has been advanced to explain this behavior is that at the upper yield point dislocations break away from the nitrogen atoms which anchor them, the stress drops, and the dislocation moves until it is caught by a diffusing nitrogen atom or one which is in the path of the dislocation. This process is repeated, producing the jagged stress-strain curve. From the observed behavior and the known rate of diffusion of nitrogen it is hoped that the rate of motion of a dislocation can be calculated.

Yielding in Alpha and Beta Brass

G.W. Ardley has studied yield point phenomena in single crystals of alpha and beta brass. Single crystals of beta brass prepared in an argon atmosphere produce a smooth stress-strain curve in tensile test; there is no yield point nor any strain ageing effects. Similar crystals prepared in nitrogen, however, give a sharp yield point. Immediate reloading after an initial straining produces a smooth stress-strain diagram. If the specimen is aged for two hours at 150°C after the initial straining, a sharp yield point is obtained upon reloading.

A marked yield point in a face-centered cubic metal has never been detected, and for this reason the work on alpha brass is extremely interesting. It has been discovered

that single crystals of alpha brass containing nitrogren display a sharp yield point discontinuity. These specimens can be strain-aged in two hours by heating to 150°C or instantaneously at 200°C. If the specimen is tensile tested at 200°C, blue brittleness is obtained.

The theory for this behavior, advanced by Cottrell, states that the strain around a solute atom must be suitable to relieve the stress around a dislocation. Basically, there are two types of dislocations: edge and screw. To relieve the stress around an edge dislocation requires shear and hydrostatic strain, but with a screw dislocation only a shear component need be present. In a body-centered cubic lattice, the interstitial atom goes to a cube edge and therefore can relieve the shear component because the lattice is non-symmetrical (i.e., slightly tetragonal). Thus, in a body-centered cubic lattice, both edge and screw dislocations can be anchored by interstitial atoms.

In a face-centered cubic lattice, an interstitial atom produces only hydrostatic strain since the atom goes to the cube center. No tetragonality is produced and it might be expected that screw dislocations can not be anchored by interstitial atoms. In an alloy such as alpha brass (60 Cu-40 Zn), however, an interstitial atom has different size atomic neighbors and this asymmetry is sufficient to produce the yield point effect.

In addition, the theory predicts that small but detectable yield points might be obtained in pure elementary face-centered cubic metals containing interstitial atoms. A screw dislocation in a face centered cubic metal can be split into two components, one of which could have a strong edge component. This edge component could be locked by interstitial atoms, which could lock the screw component through its elastic coupling. Experiments on pure copper containing interstitital atoms are now in progress to check the validity of this prediction.

Yielding in Iron

H.W. Paxton has worked on yielding phenomena in single and polycrystals of carburized and decarburized iron over a wide range of temperatures. It has been found that tensile tests on single crystals of carburized (.003°/∞C) iron at the temperature of liquid air produce a series of discontinuities which are due to the formation of twins. Previous investigators have shown similar behavior for polycrystalline iron containing carbon. Decarburized single crystals tested at liquid air temperature do not twin and a smooth stress-strain curve is obtained.

There has been some controversy as to whether
a sharp yield point exists in single crystals of carburized
iron stressed at room temperature. Paxton has shown that
sharp yield points occur at this temperature in both single
and polycrystals of carburized iron. Additional experiments
have been conducted in which specimens are restressed at
room and low temperatures after initial room temperature
loading to yielding. If a specimen is restressed at the
temperature of liquid air, a smooth stress-strain curve is
obtained, indicating that the low temperature suppresses
strain-ageing. If, however, the retest is done at room
temperature, a slight yielding occurs since iron ages fairly
rapidly at this temperature.

At temperatures from 100° to 200° C, blue brittle-
ness is encountered in both single and polycrystals of carburiz
iron due to strain-ageing during the test. Decarburized iron
gives smooth stress-strain curves under similar test conditions

At temperatues above 200°C, smooth stress-strain
diagrams are obtained with all specimens. Apparently in this
case strain-ageing occurs so readily that dislocations never
break away from carbon atoms since the mobility of carbon is
so high at these temperatures.

Appearance of Slip in Iron

Paxton is also investigating the influence of
surface conditions on the appearance of slip-lines. Working
with single crystals of iron (containing .003°/o C) strained
to the yield point, he has found that the separation of slip
lines on a mechanically polished surface (by lightly rubbing
with fine alumina) is on the order of 5 to 10 microns, while
this distance is approximately 2 microns on an electrolyti-
cally polished surface. This result suggests that many of
the previous observations of slip behavior have been strongly
influended by surface preparation, and that the lines usually
seen are the coarse slip associated with the cold worked
layer. If the mechanically polished surface is electrolyti-
cally polished to remove a layer of a few microns, both coarse
and fine slip are seen. The two types of slip appear to be
continuous since the coarse lines branch out at their ends to
form or join the fine lines. Electrolytic etching to a depth
of about 8 microns removed all evidence of the coarse slip in
his specimens.

A MECHANICAL MEMORY UNIT FOR COMPUTING MACHINES

Plans have been made by the Institute for Applied
Mathematics of the Swiss Federal Institute of Technology
(Zürich) to replace the memory unit of their Zuse relay com-
puter (ESN 5, 265 (1951)) by a series of mechanical cross bar

selectors, patterned after a design commercially developed for use in Swiss telephone exchanges. The complete memory is to be built up of frames, each containing the necessary components to store 9 words of 50 binary digits each. One such frame has been assembled to the point where it stores 3 words of 50 bits each.

Words are stored in columns, binary digits of corresponding positions occupying a row. The storage of a zero or a one at a given place is determined by the position of a thin flexible wire running perpendicular to the plane of the cross bars. Its distal end is firmly attached to the rear wall of the unit while its front end is free and protrudes a little beyond the plane in which the selector bars operate. To each binary position there corresponds a bar with notches, there being two notches for each binary digit. A zero is stored if the elastic wire rests in the left notch and a one if it rests in the right. To each word there corresponds a vertical bar carrying on its left edge a series of metal hooks. This bar, when pulled down by a relay-activated magnet, is located so that the hooks will engage all wires in the one-position while missing those in the zero-position. In this fashion contacts are made wherever a one is stored. In addition, there is for every word-bar with hooks a second vertical bar just inside the former and capable of being moved independently. It engages all wires in its column and when pulled down will disengage them from the notch of the row-bar in which they rest. When so disengaged, all wires will spring back to the zero-position. If a one is to be stored in a given row the corresponding horizontal bar is pulled to the left by exactly the amount necessary to bring its one-notches into the position previously occupied by the zero-notches. The vertical bar is now released and the wire corresponding to the activated row slips into the one-notch and is finally deflected into the correct position as the horizontal bar returns also to rest position.

As presently conceived, the individual unit occupies a chassis about three inches deep, eight inches wide, and two feet high . While a hundred such units will amount to quite a bulky assembly, their commercially tested high reliability assures easy maintenance once the installation is completed.

MECHANISM OF THE EFFECT OF LIGHT ON THE TESTIS OF THE DUCK

For many years investigations have been made on the mechanism of annual periodicity in the reproductive activity of animals. Allied to the problem are those of the

basis of bird migration and changes in plumage and of the condition of the pelt of fur-bearing animals from the winter to the summer condition. Investigations have been made to test whether changes in temperature, physical activity, or food intake are the basis of such annual rhythm. These have shown that one of the most important factors in regulating such physiological processes is light. The means by which light accomplishes its effect has been studied by Professor J. Benoit, University of Strasbourg, who has shown that light has a stimulating effect on the testis of the duck during the non-breeding season. This is demonstrated by extreme hypertrophy of the testis when the duck is exposed to increased periods of illumination at this time.

Professor Benoit is interested in the role of the eyes in this process. The ocular sensitivity of the duck, as determined by pupillary reaction, is greatest to light of 500-550 mμ. Benoit has found, however, that the testis responds by marked hypertrophy when the duck is irradiated by light of longer wavelengths. To determine this, he exposed immobilized ducks to light of various known wavelengths and energy content for 10 hours per day for 12 days. This treatment caused the testis to increase in weight from 10 to 20 times. All wavelengths were not equally effective, stimulation being greatest for wavelengths between 600 and 750 mμ, indicating that the sensitivity of the eye and the response of the testis were quite distinct functions.

In other experiments the eyes of the duck were removed and the light allowed to shine directly into the empty orbits. In these he found that testicular stimulation was also achieved, but that it occurred quite equally at all wavelengths of visible light. It would appear that the eye actually had acted as a filter and prevented some effective wavelengths of light from passing through the orbit and falling on the tissues of the brain. It was then shown that light shining on the intact and living duck passes through the eye and illuminates the brain in the region of the supra-optic nucleus in considerable amounts. This was determined by placing strips of photographic film in the region of the supra-optic nucleus in living ducks and exposing the eye to light of the same intensity as that required to cause testicular stimulation. Light sufficient to affect the film was found to pass through the tissues in a very short time. It would seem possible, therefore, that the testicular stimulating effect of light is brought about, not by the eye, but by some photosensitive neural elements located near the supra-optic tract.

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EXPERIMENTAL PRODUCTION OF FETAL AMPUTATION IN RATS

During the past several years Dr. A. Jost, Laboratory of Animal Biology, Faculty of Science, Paris, has been studying the effect of hypophysectomy (by decapitation) in rat embryos. This procedure has led to, among other things, deficiencies in the development of the gonads and adrenal. The atrophy of the adrenal was prevented by treatment with a preparation of ACTH, but in several instances the result of this treatment was that the extremities of the tails, digits, or limbs were missing at birth. It was found that the ACTH used contained appreciable posterior pituitary activity when tested for the pressor factor.

In order to determine whether the posterior hypophysial material was responsible for the effects observed, 1 to 2 tenths milligram posterior pituitary powder was implanted into 17 day old rat fetuses. Within six hours a marked edema of the skin of the distal segments of the tail and limbs was found. Subsequently blisters formed, the blood vessels became greatly dilated, and the tissue finally hemorrhagic. Twenty-four hours later the cartilage in these regions showed signs of degeneration. This was followed by complete necrosis, loss of that part of the tail or limb, and finally healing of the proximal portion. The period in development in which this reaction could be produced was short. It is believed that the original action of the ACTH preparation was due to the contamination with posterior pituitary factors, because more highly purified preparations have not had this effect, but when mixed with purified pressor substance the loss of extremities is again produced.

The end result of the process described, namely amputation of extremities, produces a congenital anomaly very similar to those described by Professor Streeter in man as resulting from focal necrosis rather than strangulation by amniotic bands as previously believed. Similar anomalies have been seen in rabbits and mice (Little and Bagg, Greene and Saxton) in which the developmental stages have been studied. They showed the same sequence of events as in the experiments of Jost—edema, blisters, hemorrhage, necrosis, and finally healing of an amputation.

THE HISTOLOGICAL APPEARANCE OF INTRASPLENIC THYROID GRAFTS

A study of the structure of intrasplenic thyroid transplants has been made by Professor R. Cordier, and Drs. L. Craps and Ph.Martin, Histology Laboratory, Faculty of Medicine, Brussels University, Belgium. They find that thyroid tissue growing in the spleen of rats becomes very hyperplastic, and resembles adenomas if the host is completely thyroidectomized. Thyroid grafts to other parts of the body

do not have this appearance. The transplants lose their normal architecture, and follicles disappear, leaving a solid mass of epithelial cords. Intermediate conditions in which the thyroid tissue appears to be under the influence of strong thyrotropic stimulation are found in early stages. If some thyroid tissue remains in the normal location this reaction does not occur.

The Belgian workers tentatively interpret this result by suggesting that the thyroid hormone produced by the graft is carried to the liver by the portal circulation and is there inactivated. The decrease in available thyroid hormone in the body results in an overproduction of thyrotropic hormone which causes the stimulation of the thyroid graft observed. These results confirm those of Gabe and Arvy in the Laboratoire d'Anatomie et Histologie Comparées de la Sorbonne, Paris, who had additional evidence of thyroid deficiency in similar animals. An alternative explanation of these findings proposed by Cordier and associates is that the splenic environment in some manner inhibits the synthesis of thyroid hormone. This suggestion arises from the fact that thyroid hormone administered by mouth presumably passes via the portal circulation through the liver, in some form, but remains capable of its normal physiological activity.

PHYSIOLOGY OF THIRST

A thirst center in the hypothalamus has been located by Dr. Bengt Andersson of the Veterinary College in Stockholm. After direct injection of 0.1 ml of 1.5 to 2.0°/o NaCl into the anterior medial region of the hypothalamus of goats there was a latent period of 1/2 to 1 1/2 minutes and then the goats drank 500 to 2500 ml of tepid water. Injections of isotonic or hypotonic saline had little or no effect. Injections into the posterior and lateral parts of the hypothalamus were not effective. It would appear that cells reacting specifically to increased osmotic pressure are located in the anterior hypothalamus. A preliminary note has been submitted to Experientia. (Contributed by the State Department Science Office)

ENDOCRINOLOGY COLLOQUIA PROCEEDINGS PUBLISHED

During the past two years nine international symposi on endocrinology have been held in Ciba Foundation, London. These symposia, each lasting two to four days, ware attended on invitation by outstanding workers from many countries. The informality and intimacy of these meetings have permitted discussion of current and incomplete research and stimulated live speculation and discussion.

The proceedings are now being issued in full in book form with only a minimum of editing. The conclusions of the meeting on Nomenclature of Steroids were published as a supplement to the June 23, 1951, issue of Chemistry and Industry. The remaining eight colloquia will appear in four volumes under the general editorship of Dr. G.E.W. Wolstenholme, Secretary to the Ciba Foundation, assisted by Miss M.P. Cameron. These books are being published by J. and A. Churchill Ltd., London, and Blakeston and Co. Philadelphia, and will appear at various dates this spring. The series will cover the following topics: Volume I, Steroid Hormones and Tumor Growth; Steroid Hormones and Enzymes; Volume II, Steroid Metabolism and Estimation; Volume III, Hormones, Psychology, and Behavior; Steroid Hormones Administration; Volume IV, Anterior Pituitary Secretion; Hormonal Influences in Water Metabolism.

CHROMATOGRAPHIC PAPER

As a result of the publication by H. Kunkel and Arne Tiselius of "Electrophoresis of Proteins on Filter Paper" in the Journal of General Physiology, 35 p. 89, 1951, a large number of requests have been received by the authors concerning a source of the recommended filter paper which is Munktell No. 20, 150 g. The sole agent in the United States is E.H. Sargent and Company, Chicago 30, Illinois. They list this as Munktells Chromatographic Paper, Cremer-Tiselius, S-18860, which is sold in sheets 50 x 70 cm at a cost of $6.00 per 20 sheets. The paper is made in Sweden at the Grycksbo Papersbruk, Grycksbo, Sweden. (Contributed by the State Department Science Office.)

PAPERS ON THE OPTICAL STUDY OF THE EARTH'S ATMOSPHERE

A series of papers on the optical study of the earth's atmosphere has been published in book form by the Institut d'Astrophysique of the Universite de Liège. The papers were presented at a symposium in Liège in September, 1951. Copies may be obtained for $4.00 from the Secretary of the Institute. The majority of the papers is concerned with phenomena occurring at high altitudes such as the aurora and the glow of the night sky.

TECHNICAL REPORTS OF ONRL

The following reports have been forwarded to ONR, Washington, Since the last issue of ESN. Copies may be obtained from the Technical Information Office, Code 250, Office of Naval Research, Washington 25, D.C.

ONRL-10-52 "Meeting on Sintering at Bristol" by
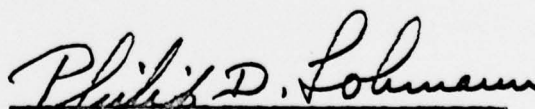   E. Epremian

PERSONAL NEWS ITEMS

        The Holweck Medal and Prize has been awarded by
the Council of the Physical Society (London) to Professor
Louis Neel of the University of Grenoble for his work in
magnetism.

        The Cross of Alphonso X, "El Sabio", has been
awarded to Professor José M. Otero for his distinguished
work in physiological optics and for his achievements in
the organization and administration of science in Spain.
Otero is the Director of the Instituto de Optica "Daza
de Valdes" in Madrid. He is also Director of the Spanish
Naval Research Laboratory, Vice-President of the Commission
on Nuclear Energy, and holds the rank of Colonel in the
Spanish Navy.

FORTHCOMING EVENTS

        A conference and exhibition on Instruments and
Measurements is to be held in Stockholm 23-30 September
instead of June as previously announced. Further infor-
mation can be obtained from S.T. Eriks-Massan, Lidingovagen
10, Stockholm 26, Sweden.

Prepared by the Scientific Staff
Submitted by Dr. S.R. Aspinall
            Deputy Scientific Director

PHILIP D. LOHMANN
Captain, U.S.N.
Assistant Naval Attache for Research